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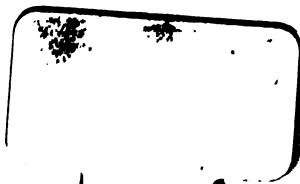
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A GUIDE
TO
CANDIDATES FOR THE EXCISE,

WITH
THREE SETS OF EXAMINATION PAPERS, ANSWERS,
SPECIMENS OF ESSAYS,
AND DIRECTIONS FOR INTENDING COMPETITORS.

BY
R. JOHNSTON,
AUTHOR OF THE CIVIL SERVICE ARITHMETIC, ETC.



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A Guide

FOR

CANDIDATES FOR THE EXCISE.

THE mode of entering into the *Excise* has been considerably varied since the abolition of the system of patronage and nomination. Such appointments are now filled up by means of competitive examinations held periodically, generally speaking, three times in every year, as vacancies arise. Having procured copies of the questions given at the Open Competition for the Excise in February, 1871, when more than 700 candidates presented themselves for examination, and again in June, 1871, when some 500 were examined, and having had a most extensive experience in the preparation of candidates for all classes of Civil Service examinations, persons who intend to compete may receive such remarks as are made on the various subjects which constitute the programme of examination with that amount of confidence usually accorded to a successful teacher.

Though many of the intending competitors, at least for some weeks previous to the examination, wisely place themselves under the guidance of teachers of eminence in their profession, yet a large per-centage from various causes are unable to do so, particularly those who live in remote country districts. To the latter the following observations must be doubly valuable, especially to those who have not yet made a first attempt at the examination. It is neces-

sary also for persons who purpose undergoing a short course of special preparation, to work some time in the country previously, lest the classes which they join in London, Dublin, or elsewhere may be too advanced for their individual improvement. The programme issued by the Civil Service Commissioners for the open competition for 60 Second Class Assistants of Excise in June, 1871, is here annexed.

INLAND REVENUE DEPARTMENT.

Regulations (framed in pursuance of Her Majesty's Order in Council of the 4th June, 1870) for an open competitive examination for the situation of Second Class Assistant of Excise in the Department of Inland Revenue :

1.—“Candidates will be required to satisfy the Civil Service Commissioners that they are natural-born subjects of Her Majesty; between the ages of 19 and 22 on the day of the examination; that they are unmarried, and without family, and of good health and character.

2.—“Candidates who have served as pupil teachers or schoolmasters in schools under inspection by the Committee of Council on Education, England, or by the Commissioners of National Education, Ireland, will be reported specially to those departments, and such of them as have been trained in normal schools at the public expense will not be qualified to receive appointments until the consent of those departments and the concurrence of the Treasury therein has been notified to the Civil Service Commissioners.*

3.—“The examination will be in the following subjects, viz :—

1. Handwriting, 200 marks; 2. Orthography, 200 marks; 3. Arithmetic (to vulgar and decimal fractions), 300 marks; 4. English Composition, 200 marks.

4.—“Candidates failing in any of the above-named subjects will not be eligible.

* It appears that the Treasury do not object to the admission of pupil-teachers and schoolmasters into the Civil Service further than what is here stated, provided they refund one-third of the salary received during the period they had been pupil-teachers before entering the office to which they have succeeded. Teachers who have been trained must refund about £40 before obtaining appointments.

5.—“A fee of £1 will be required from each Candidate attending the examination.

“Civil Service Commission, 19th May, 1871.”

“An open competition will be held in London, Edinburgh, Dublin, Cork, Galway, and Belfast, under the above regulations, on Friday, 23rd June, 1871. Sixty persons will be selected, if so many should be found qualified, with the view of filling the sixty vacancies which are expected to occur before the 31st October next.”

“NOTE.—Second Class Assistants of Excise receive a salary of £60 per annum, with an additional allowance of 2s per diem when actively employed. They are eligible for promotion to higher situations.

The successful candidate is first compelled to undergo a course of instruction for about six weeks attached to some distillery, under the superintendence of a superior officer of the department. According to the usual course of promotion he may after about two years expect to become a *first-class* assistant; in about two years more he obtains a “ride,” in which he usually remains four years before he can be appointed a division officer. Having passed the examination for a supervisorship, he can after a short time compete for a collectorship. Without any pretence for that extreme accuracy which every experienced officer of the department necessarily possesses, we may safely state that the above is a sufficiently correct outline of the general course of promotion.

The following information, from the latest Parliamentary returns, is also of importance to intending candidates :—

* The next examination will probably be held in October, or early in November, 1871.

INSPECTORS OF EXCISE, ENGLAND.

No.	Name of Office.	Salary.
1	Principal	£800—25—900
3	1st Class	600—20—650
2	2nd Class	450—10—500
13	2nd Class	360—10—400
14	3rd Class	350—...—350
45	Examiners	...—...—180
1	Diary Assistant	300—10—350

OUT-DOOR ESTABLISHMENT FOR EXCISE.

No.	Name of Office.	Salary.
5	Collector—1st Class	£700—20—800
15	" 2nd Class	555—20—600
44	" 3rd Class	450—10—500
5	Clerks to Collectors' Chief Clerks	230—10—280
67	" " 1st Class	190—10—220
29	" " 2nd Class	150—5—180
65	" " 3rd Class	100—5—140
64	Supervisors of Foot Walk Districts	260—10—300
227	" Riding Districts	210—10—250
267	Officers of Divisions—Seniors	160—8—200
649	" " " "	130—5—150
770	Officers of Rides " "	110—5—125
55	Assistants—1st Class	95—...—...
300	" 2nd Class	60*—...—...

SCOTLAND.—The Establishment in Scotland consists of 114 Second Class Assistants, 110 Assistants, 86 Officers of Rides, 325 Officers of Divisions, &c., with similar salaries respectively.

IRELAND.—There are 83 Second Class Assistants, 70 First Class Assistants, 175 Ride Officers, 145 Division Officers, and so on, with salaries as above.

* These Officers receive 2s. per diem additional when actively employed in Divisions, but 2s. per diem when employed in Rides.

We shall take up the programme, and make a few observations on each subject as briefly as possible.

HANDWRITING.

Opinions vary very much as to what constitutes good handwriting—what one would call good writing, another may call only middling. In most instances, however, all agree, when a neat and finished specimen of penmanship is placed before them for inspection, in pronouncing it good writing. An opinion has recently been almost universally adopted by the public ascribing to the Civil Service a particular kind of handwriting, which alone is looked upon with approval by the Examiners, and is considered genuine by the public. This conviction has seriously injured many candidates who a few weeks before going in for examination have studiously endeavoured to totally change their handwriting; and not having had sufficient time to effect this object, have gone into the examination-hall without any fixed system of penmanship, and in consequence obtained a very low mark; whereas, had such candidates carefully improved the hand which they had been accustomed to write, a contrary result would have undoubtedly ensued. The importance of great attention to handwriting cannot be over-rated, when it is borne in mind that it affects all papers sent in to the examiners, giving them an appearance of neatness, tidiness, and finish, or on the contrary, an appearance of slovenliness, untidiness, and unsteadiness in execution.

To improve the penmanship teachers have adopted different methods. Some prefer much practice in writing copies, others recommend an imitation of some standard writer in the school, generally an assistant-master who has succeeded in acquiring a tasteful and finished hand. Copies with heading lines are very good, but it has been found that after writing the same line over again six or seven times, the performer becoming wearied from the monotony of the exercise, relaxes into a careless handwriting, and finishes with a scribble more injurious than otherwise. One of the best writers of what is known as the Civil Service hand, above referred to, with whom we have been acquainted, improved his penmanship, in addition to the ordinary careful daily dictation, by writing over and over again the same headline; "Command of hand is grand." In fact, he wrote this line dozens of times daily, and was rewarded for his industry by receiving from the Examiners 95 marks out of a maximum of 100, a result that should satisfy the most ambitious student

The Civil Service Commissioners very fairly and fully set forth the grounds on which they judge of penmanship, namely; "Good handwriting consists in the clear formation of the letters of the alphabet." A youth preparing for one of these examinations must be able to write rapidly, that he may omit no words in the dictation, which is frequently read very fast by the Superintending Examiner. Handwriting is tested by an exercise similar to that given below. Indeed this very exercise was given in February, 1871, at the Open Competition for the Excise.

*Copy as much of the following as you can in half an hour, taking care to copy neatly and correctly, and to write as well as you can.**

N.B.—Good Handwriting is held to consist chiefly in the CLEAR FORMATION OF THE LETTERS OF THE ALPHABET.

At the Court at Osborne House, Isle of Wight, the 4th day of February, 1869.

Present :—The Queen's Most Excellent Majesty in Council.

WHEREAS, there was this day read at the Board, a Memorial from the Right Honorable the Lords Commissioners of the Admiralty, dated the 1st of February, 1869, in the words following, viz.:—

“Whereas, by Your Majesty's Order in Council, dated the 14th of January, 1869, certain alterations have been authorised in the constitution of the Board of Admiralty, including the merging of the office of the Comptroller of the Navy into that of Third Lord: We beg leave most humbly to represent to Your Majesty that this measure has rendered it advisable to make corresponding changes in some of the offices, together with the salaries and allowances attaching thereto; as set forth in the following table:—

NAME OF OFFICERS.	Present Salaries and Allowances.	Future Salaries.
	£	£
Director General of Naval Ordnance -	1,456	1,000 456 Half-pay.
Chief Constructor - - - -	1,000	
Engineer in Chief - - - -	900	1,260
Engineer Assistant - - - -	550	Place abolished. 600
Valuer and Inspector of Dockyard Work - - - -	700	Place abolished.
Master Shipwright, Portsmouth -	700	Place abolished.
Professional Secretary to Chief Constructor - - - -	- - - -	550
Assistant Master Shipwright, Chatham	400	Place abolished.
	650	} Place abolished.
Chief Engineer, Portsmouth -	365	
	Allowances	
Assistant Engineer - - - -	400	500

* In some Competitive Examinations a ruled form is given, and the exercise is longer than the above.

SPELLING.

The importance of this subject exceeds that of any other in the programme. Bad spelling disqualifies, however excellent the answering may be in *all* other subjects. Any one can easily test himself in spelling. Let him obtain the assistance of a friend, who will ask him to write down out of *The Civil Service Spelling-Book*, say, a column of words, given under dissyllables, another under trisyllables, and a third column of polysyllables. If he has made only two or three mistakes, he may be perfectly satisfied with his performance; and may with confidence enter the examination-hall, after writing one or two "orthographical" exercises in the time specified at the top of each.

Candidates exhibit such a variety of proficiency in this subject that it is difficult to lay down rules calculated to be beneficial to one class of proficient which might not be positively injurious to another. Bearing this in mind, and discarding all empirical rules, we shall give directions for the improvement of the most backward in the first instance. It may be remarked that a very injudicious use of imperfect, or bad spelling, by some young and inexperienced teachers has been made, much to the detriment of the pupils under their charge. Some teachers, by permitting pupils to correct bad spelling daily, have succeeded in effecting an object the very opposite to that intended. Forgetting that the eye is a great guide to correct orthography, they have allowed the learner to be so much accustomed to *see* bad spelling that his eye gives him no assistance whatever. It is perfectly obvious that in order to teach a person to make a good and perfect watch, it is not necessary to show him badly

made watches. Common sense seems to indicate that those of superior mechanism should be kept in view, to allow him to imitate their excellences. At the same time a good and faultless test of the extent of a watchmaker's knowledge might be obtained by bringing before him a badly constructed watch, and requiring him to explain wherein it was faulty; and a still greater test in asking him to improve or bring it to perfection of mechanism. When a person makes from twelve to twenty errors in an ordinary dictation, this exercise, though very agreeable to most pupils, is too advanced for him; and he should for a considerable time, varying with the amount of improvement, copy from an easy book, with the utmost care, until his eye becomes trained to the appearance of words when written correctly. Most learners have an aversion to going over the same exercise again; and when they are required to copy a paragraph, they frequently exclaim, "I did this a few days ago," or some such observation. The teacher can in general overcome this repugnance by asking the number of errors made on the previous occasion, and adding, that he now expects fewer. In this manner the attention of the learner will be fixed intently on the exercise, and the work will be profitable. For, there is not only such a thing as unprofitable work, but positively injurious work done in schools. The old system of compelling pupils to copy out a certain portion of a book as a punishment for some fault, is an instance of this; and, in addition, all careless and slovenly work is injurious to those who have to undergo a severe competitive examination.

In a word, it may be safely recommended to all students who are backward in spelling to perseveringly use careful

copying, and as they gradually improve, to add dictation exercises, always keeping a corrected list of the words misspelled, which should be turned up once a week for repetition. When the learner has made such progress that he only misses three words out of a moderately difficult dictation, such as that on "London," or "The Badger," he may safely go through the columns of his spelling-book, and almost perfect accuracy will finally reward him for his industry and perseverance.

DICTATION SPECIMENS.

The following Exercises for Dictation have been given by the Civil Service Commissioners:—

I.

These apparently trivial observations seem to take away from the dignity of writing, and therefore are never communicated without hesitation. But it must be remembered that life consists not of a series of illustrious actions or of elegant enjoyments; the greater part of our time passes in compliance with necessities, in the performance of daily duties, in removing little inconveniences, or in procuring petty pleasures. The manners of a people are not to be judged of in the schools of learning or the palaces of greatness, where the national character is obscured or obliterated by travel or instruction, by philosophy or vanity; nor is public happiness to be estimated by the assemblies of the

gay or the banquets of the rich. The great mass of nations is neither rich nor gay; those whose aggregate constitutes the people are found in the streets and villages, in the shops and farms; and from them, collectively considered, must the measure of general prosperity be taken. According as they approach to delicacy a nation is refined; and when their conveniences are multiplied, a nation, at least a commercial nation, must be denominated wealthy.

II.

The appearance of this town scarcely corresponds with its real opulence and importance; a considerable portion of the houses being crowded in narrow irregular lanes, which are but indifferently paved and drained. Within the last quarter of a century, however, great improvements have been effected, and are still in progress; footpaths have been formed in most of the streets, and the whole town has been completely lighted with gas; various new squares have been formed, and a considerable number of handsome houses and villas have been erected, mostly near the southern entrance. It is well supplied with excellent water, which is conveyed to the upper rooms of every house in the town. The church, which stands on an eminence, is a plain ancient structure, with a low tower, built of the dark red sandstone of the district. The importance of the place and its neighbourhood is entirely derived from its manufactures, which were carried on here at a very remote period. As early as the reign of Henry the Eighth it was famous for its cottons, or, more properly speaking, for a peculiar description of woollen goods that went by that name. Real cotton goods,

however, began to be produced in considerable quantities towards the middle of the last century. But the great prosperity of the town dates from the time when that wonderful invention called the spinning frame was brought into operation. The result has been that many thousand persons are now employed in the town and its immediate vicinity in the various branches of the cotton manufactures.

III.

Those who desire to become better acquainted with this remarkable man should consult his correspondence, which is the best record of his life, and affords the most vivid representation of his character. It presents us with the progressive development of his mind and views, till the one reaches the vigour and the other the comprehensiveness for which at length they became distinguished. He combined intellectual and moral qualities in a degree and with a harmony rarely found. The most strongly marked feature of his intellect was the strength and clearness of his conceptions. It seemed like the possession of an inward light, so intense that it penetrated on the instant every subject laid before him, and enabled him to grasp it with the vividness of sense and force of reality. Hence, what was said of his religious impressions may be used to characterize his intellectual operations: "He knew what others only believed; he saw what others only talked about." Hence also, perhaps, arose in a great measure the vehemence with which he opposed views and notions contrary to his own. Of his moral nature, honesty and fearlessness, earnestness, and love of truth and justice, were the prominent qualities; and though these were calculated to give an aspect of sternness to the outline

of his character, yet they were tempered with an expansive benevolence, and combined with a tenderness of disposition, which rendered him an object of the most devoted attachment to all about him. It was said by one who knew him well, that "he loved his family as if he had no friends, his friends as if he had no family, and his country as if he had neither family nor friends."

IV.

[*Given by the Civil Service Examiners, 20th December, 1870.*]

The forms of English law, however inadequate to defend the subject in state prosecutions, imposed a degree of seeming restraint on the crown, and wounded that pride which is commonly a yet stronger sentiment than the lust of power with princes and their counsellors. It was possible that juries might absolve a prisoner; it was always necessary that they should be the arbiters of his fate. Delays, too, were interposed by the regular process, not such, perhaps, as the life of man should require; yet enough to weaken the terrors of summary punishment. Kings love to display the divinity with which their flatterers invest them in nothing so much as the instantaneous execution of their will, and to stand revealed, as it were, in the storm and thunder-bolt, when their power breaks through the operation of secondary causes, and awes a prostrate nation without the intervention of law. There may indeed be times of pressing danger, when the conservation of all demands the sacrifice of the legal rights of a few: there may be circumstances that not only justify, but compel, the temporary abandon-

ment of constitutional forms. It has been usual for all governments, during an actual rebellion, to proclaim martial law, or the suspension of civil jurisdiction. And this anomaly, I must admit, is very far from being less indispensable at such unhappy seasons in countries where the ordinary mode of trial is by jury, than where the right of decision resides with the judge. But it is of high importance to watch with extreme jealousy the disposition towards which most governments are prone, to introduce too soon, to extend too far, to retain too long, so perilous a remedy. In the fourteenth and fifteenth centuries the court of the constable and marshal, whose jurisdiction was considered as of a military nature, and whose proceedings were not according to the course of the common law, sometimes tried offenders by what is called martial law, but only, I believe, either during, or not long after a serious rebellion. *

SPECIMENS OF ORTHOGRAPHICAL EXERCISES.

[To be used with great caution.]

I.

[Time 30 minutes.]

But awl thees glowrees and substantchal advantadges were butt the gylding off the chanes of servittude. The Penal Code made its appeerance early in the yere, and of the crymes which it ennumerated, no less then haf ware stait ofences, so minutele y subdvided and speseifyed, as in affect to render ameenable to punishment evry won ob-

nokshus in the smawlest deggree to government. By a dekree in the spring of the saim yere, aite stait prissons were istablished in France, and were soon filed with a straining and inkongrous asemblaige. Thoes in the North ware chiefly occuppied by Demmocrats, thoes in the South by ecclessiasticks whoe had being innvolved in the fawl of the Pope; butt numbirs were imuered for no other reeson than having aksidentelly eksited the gellosy of the Empe-
rour or his minnisters. An order, sined by Napolian or his Minnister of Police, was a suffishent warrent, not onely in France, but threwout Jeremeny and Ittaly, for the arest of enny individuel, whoe was parraided thro the townes loded with chanes leike a mallifactor, and then consined to the gluemy oblivvion of the stait prissons. The unniversalety of the imperiel sweigh aded feerfully to its terors; except in Rusha, Turkey, Brittain, Urope aforded no asylam for the viktim of tiranic pursicusheon. A desspotisem was thus afectuelly manetaned, unparraleled for rigger and severrity in moddern tymes; not a whispur of dissoncontent or ressis-
tence was herd; and awl clases vyed in adulashon of the rewlор whoe was vissibly draneing the hart's blud of the cuntry.

II.

[Time 30 minutes.]

We hev had allreddy suffishent occassion dewring the coarse off this histery, to menshon the dispencing power of emprisonment of eksacting loanes and bennevalenses, of pressing and quartoring soljors, of awltering they kustims, of errecting monopolley's. Thees branches off pouer, if not direckly oposite to the principles of all free goverment,

must, at least, be aknolleeged to be danjerous to fredom in a monnarkikal constittution, where an eeternal jellocy must be presserved agenst the suveran, and no disskreshhonary pouers must ever be intrusted to him, by witch the propertie or personel libbarty of enny subject can be effected. The kings of Ingland however had allmost konstantly exercised thees pouers; and if on enny occassion the Prins had being oblidged to submitt to laus ennacted agenst them, he had evver, in practise, illewded these laus, and retourned to the saim arbittrery adminnistration. Dureing allmost three sentcherries before the accesion of James, the reegal orthorety, in awl thees pertickelers, had never onse been kalled in questshun. Wee mai allso obssurve that the principals in general, witch prevaled dureing that aije, was so feverable to monnerkie, they bestoed on it an orthorety allmost absolute and unlimmited, sacredd and indefeasable. The meatings of Parlyment ware so pricarous; there cesions so short, cumpaired to the vacations; that wen men's eyes were tourned upwerds in serch of suveran pourer, the Prinss aloan was apped to streik them as the onely purmenent majestrate, invested with the hole madjesty and orthorety of the stait. The grate complaisance two of Parlyments, dureing so long a pierreod had ecstreemly diggraded and obskewered those assemblys: and as awl instances of oposition to perogative must ave been draun from a remoot aije, they had the less orthorety even with thoes who were akwainted with them.

III.

[Time 30 minutes.]

But notwithstanding the seaming decline of his boddely powers, those of his minde were rendared more viggerous

by adversity. During the confarance, which lasted some weeks, he had to sustane aloan the difense of his cause aganst some of the most elloquent speakers of the House of Commons. All who were pressent were astonnished at his promptness of aprehension, his fasillety of expression, and his dignety of maner. While the confarance was going on, the king had parmission to take the exorcise of rideing. He gave his word of honner not to quitt the iland, but he was so slendarly garded, that it allmost apeered as if the parlement wished him to seeze some opertunaty of making his iscape. This he was importund to do by his frends, who were now alowed to have acess to him; but he rigected their advise, saying he would not brake the promiss he had given. He probbably, also, may have deseewed himself with the hope that, as the treety was now drawing towerds a conclusion, he would soon be ristoard to piece and libbaty at least, if not to his formar orthorraty. The treety consisted of sevverell article, to all of which, though ending to the abrijment of his peroggetive, the king agreed two only excepted, one of which was for the abberlition of eppiscapecy, the other that all who had born arms in his cause should be declaired trayters. After furthar dibbait, the king agreed to some medefecation in riggard to eppiscapicy; but nothing could induce him to assent to the last artecle. While a reckonsilleation between the king and parlement seemed thus approaching, Cromwell, by one dareing act, anihelated the whole power of the parlement and destrawed all Charleses' hopes. He sent Kernal Pride, a man who had formally been a draman, with a body of troupes, to seround the Parlement house, a little befour the time when the membars were to assembl, with orders to purmit only those to enter

who belonged to the independant rippublican party, and to exclood all the rest; and this he called purjing the par-
liment.

LONG-TOTS.

Those who have not been accustomed to this exercise are generally much discouraged on first trying it. A person nominated to the Civil Service some years ago, took up twelve tots and found forty-five minutes elapsed when he was ready to test the accuracy of his answers, which to his utter dismay he found correct in only three or four instances. This appeared very discouraging. However, after doing six of them every night and morning for about four weeks, he was much pleased to find he could do the twelve accurately in twenty-three minutes. Such being the experience of most people who have practised "totting," it is only necessary to add that full marks are given for perfect accuracy within the time allowed. For specimens, see page 49.

ARITHMETIC.

The reader of this volume is supposed to have already worked the elementary rules of Arithmetic; and he can probably add, subtract, multiply, and divide, with ease and accuracy. The greater number of students, however, have been accustomed to work so carelessly that their operations are extremely inaccurate, one of the worst faults to come before an examiner. Our remarks on Arithmetic are under

the following heads—Accuracy, System of Work, and Expedition.

ACCURACY.—Inaccuracy, generally speaking, arises from two causes, a careless habit of working, and inattention. If the student has been long accustomed to work carelessly and in a slovenly manner, and more particularly if his teacher has overlooked these blemishes, in order to arrive at the necessary standard of proficiency for a successful competitive examination, no better exercises can be worked at first than those in Simple Multiplication, which, after some practice, will tend to secure for him expertness in the working of more difficult questions. Let him also learn the tables thoroughly, so that he may have no hesitation in performing any operation in reduction. Indeed many candidates are unable to proceed with the examination paper, from lacking a perfect knowledge of the arithmetical tables. It is in the simple operations of addition, subtraction, multiplication, and division that the true foundation of arithmetic is laid. Knowing the tables accurately, with careful practice, ensures accuracy in reduction. Frequently pupils avow to their extreme inaccuracy, and after several attempts at improvement are almost ready to despair. Most undoubtedly their inaccuracy has arisen, in most instances, from their being unable to fix their attention on the subject before them. Careful training in the elementary rules will in a short time produce an improvement.

SYSTEM OF WORK is also very important, and bears considerable weight in the result of the examination. This matter is often overlooked by teachers, and its importance is frequently disregarded by pupils, who, as a rule, seem perfectly satisfied when they have obtained the proper result,

although they may have used 150 figures instead of fifty. One of the commonest errors in system to be met with consists in such questions as the following:—Suppose a question is stated in Simple Proportion as below—

$$78 : 325 :: £9 \ 17s. \ 8d.$$

The first thing most students would do is to reduce the third term to pence. Of course, in many instances, this must be done. However, in the case before us, there is no need of this reduction. It is preferable to divide the first and third term by 2, and then we have

$$39 : 325 :: £4 \ 18s. \ 10d.$$

Now, after resolving the first term into its factors 13×3 , we find 3 will not divide evenly into either the second or third terms. Again, trying the next factor 13, we find it is also a factor of our second term, and we now have

$$3 : 25 :: £4 \ 18s. \ 10d.$$

It is true some very intelligent learners would easily see that 13 is a factor of both first and second terms. However we preferred to proceed in the manner which would in all probability be adopted by the majority of our readers. We now multiply £4 18s. 10d. by 25, using the factors 5×5 and divide by 3 for the answer. In order to improve the student's method, he should compare his work with that of a good teacher; and having seen his errors, should endeavour to correct them in subsequent operations. Indeed the proper thing for a person to do when he writes down a question is to try and discover the simplest possible and shortest possible method of working it, instead of (as in the case with most young arithmeticians) com-

mencing the work without a moment's reflection. The student should also look at the "sum," and see that it could bear no meaning except the ordinary one. For instance, a certain number of tons, cwts., and qrs. might be given at a certain price per ton, ordinary wording; but if the same question were given at so much per cwt., a per-centage of the candidates would overlook this simple deviation from the ordinary wording. If it were the price per stone that was given a still greater number, in the hurry of an examination-hall, would evidently work the question widely different from the wording. An illustration of this came recently very prominently under our notice. Four candidates went in for a certain office, and the following question chanced to be for the first time given:—

"Three silver candlesticks, weighing in all 36 ounces, cost £18, the silver being valued at £12, and the workmanship at £6; what should five candlesticks cost, each of which weighs 24 ounces, and the cost of the workmanship being doubled?"

One of the candidates was particularly good at arithmetic, the other three rather weak, and not sufficiently prepared. On returning from the examination one of the latter, speaking of the above question, stated that the candidate who was considered so good sent in a wrong answer; for the others had all the same result. Having heard the question repeated from memory, it was easily concluded that instead of the three candidates sending in the correct answer, they sent in an incorrect one, and the fourth candidate a correct one, which was fully borne out on investigating the matter carefully.

EXPEDITION.—Nothing can give expedition but practice. In this practice neatness and accuracy must not be sacrificed to quickness of execution. Let the student who is slow at arithmetic work two hours a-day for a fortnight, always commencing with such a question as 706543×907543 , and at the end of this time he will himself perceive a great improvement. Afterwards he should work to time several examination papers. Let him not fall into the error of working easy questions alone; for if he has to undergo a difficult competitive examination, he must make up the whole treatise, including most of the difficult problems found at the end of the volume. The student who is very slow, should in the time set apart for arithmetic each day, commence by doing one question in each of the four Simple Rules during one week; which exercise he can vary the following week, by taking the Compound Rules instead; and the third week, by using reduction, two questions in Ascending, and two in Descending. The fourth week he can try the sets of six questions given in this manual, and so on.

The following Paper was set to the Candidates who presented themselves at the open Competition for the Excise, June, 1871:—

ARITHMETIC.

[Time allowed 2½ hours.]

You are requested to write your name at the top of each of your papers; to put the number to each question; to send up the workings as well as the answers; and to send up your work

on complete sheets of paper, not on scraps which are apt to be lost.

N.B.—You are particularly recommended to answer the questions in the order in which they are set; not omitting any one unless you are unable to do it. Occupy the whole time allowed. No extra marks will be given for rapidity in this paper.

-
1. Add together 5 , $3\frac{1}{8}$, $\frac{5}{16}$, $\frac{7}{18}$, and $\frac{1}{2}$.
 2. Subtract $7\frac{7}{17}$ from $10\frac{1}{4}$.
 3. Multiply together $5\frac{1}{2}$, $\frac{3}{17}$, $\frac{5}{18}$, $1\frac{1}{16}$, and $\frac{3}{4}$.
 4. Divide $7\frac{1}{8}$ by $9\frac{1}{2}$.
-
5. Add together $19\cdot735$, $\cdot000756$, $4732\cdot92$, and $\cdot375499$.
 6. Subtract $876\cdot93287$ from $974\cdot3217$.
 7. Multiply $9\cdot238$ by $65\cdot2$.
 8. Divide $2\cdot890721925$ by $\cdot0729$.
 9. Express $5s. 3d.$ as the decimal of $\pounds7$.
-
10. Add together $4\frac{1}{2}$, $7\frac{3}{4}$, $9\frac{1}{5}$, $1\frac{1}{8}$.
 11. Subtract $34\frac{9}{10}$ from $100\frac{3}{5}$.
 12. Multiply together $8\frac{2}{3}$, $45\frac{3}{7}$, $1\frac{1}{8}$, $\frac{21}{180}$, and $\frac{1}{14}$.
 13. Divide $8\frac{3}{11}$ by $5\frac{1}{2}$.
-
14. Add together $1\cdot35$ of a furlong and $7\cdot32$ of a yard, and give the answer in feet and the decimal fraction of a foot.
 15. Subtract $2\cdot32$ of an hour from $\cdot65$ of a week.
 16. Multiply $380\cdot73$ by $\cdot0725$.
 17. Divide $7\cdot036$ by $\cdot073$ to 4 places of decimals.
 18. Express 2 cwt. 3 qrs. 14 lbs., as the decimal of a ton and a half.
-

19. Reduce 15 lbs. $13\frac{1}{2}$ ozs. 12 dwts., to grains.
 20. If 5 hogsheads, each weighing 7 tons 3 cwt. 3 qrs. $16\frac{1}{2}$ lbs., cost £239 6s. 6d., what is that per ton.
 21. Find (by Practice) the dividend on £731 14s. 6d., at 14s. 2d. in the pound.
 22. Find the simple interest on £4,160 for $6\frac{1}{4}$ years, at 3 per cent. per annum.
 23. In 5,432,762 square feet, how many acres, roods, &c., are there ?
 24. If 20 men can mow a field of 9 acres 2 roods in $8\frac{1}{2}$ days of 10 hours each, how many fields of twice this area can 17 men mow in 50 days of 8 hours each ?
 25. Find (by Practice) the value of 2 tons 5 cwt. 3 qrs. $3\frac{1}{2}$ lbs., at £3 13s. 6d. per cwt.
 26. In what time will £3,125 amount to £3,681 12s. $9\frac{3}{4}$ d., at $£3\frac{3}{4}$ per cent ?*
-

MISCELLANEOUS.

You had better not attempt any of the following questions till you have done as many as you can of the preceding ones.

27. A grocer mixes 3 cwt. of tea which cost him 16 guineas a cwt., with one cwt. which cost him £19 12s. ; at what rate per pound must he sell the mixture so as to gain 4 per cent. on his outlay ?
28. Find the length of the edge of a cube which contains 450 feet 1,088 inches.

* Either through inadvertence, or intentionally in order to test the Candidates' intelligence, the Examiners omitted to say whether it was at Simple or at Compound Interest.

29. From the following Table :—

Railway Passengers.	Great Britain.	France.	Prussia.
1st Class ...	4,743,210	2,124,910	307,490
2nd Class ...	10,291,740	6,172,420	1,292,470
3rd Class ...	21,409,210	15,473,550	2,374,230

find the proportion per cent. which the whole number of second class passengers bears to the number of first and third class passengers in Great Britain and Prussia together.

30. Find the value of $5\cdot49$ of $\cdot0318$ of $\cdot047619$ of twenty-five guineas.

Solutions of the above.

$$(1) \quad 8,16 \times 13 \times 5 = 1040 \text{ Common Denominator.}$$

$$\text{Now } 5 + 3 + \frac{130 + 325 + 560 + 280}{1040}$$

$$= 8\frac{1228}{1040} = 9\frac{188}{1040} \text{ Ans.}$$

$$(2) \quad 10\frac{1}{4} - 7\frac{7}{17} = 10\frac{17}{88} - 7\frac{28}{88} = 2\frac{57}{88} \text{ Ans.}$$

$$(3) \quad \frac{11}{2} \times \frac{3}{17} \times \frac{5}{22} \times \frac{17}{16} \times \frac{3}{4} = \frac{45}{256} \text{ Ans.}$$

$$(4) \quad 7\frac{1}{8} \div 9\frac{1}{2} = \frac{57}{8} \div \frac{19}{2} = \frac{3}{4} \text{ Ans.}$$

$$(5) \quad \begin{array}{r} 19\cdot735 \\ \cdot000756 \end{array}$$

$$\begin{array}{r} 4732\cdot92 \\ \cdot375499 \\ \hline 4753\cdot031255 \text{ Ans.} \end{array}$$

$$(6) \quad \begin{array}{r} 974\cdot3217 \\ 876\cdot93287 \\ \hline 97\cdot38883 \text{ Ans.} \end{array}$$

$$\begin{array}{r}
 (7) \qquad \qquad \qquad 9 \cdot 238 \\
 \qquad \qquad \qquad 65 \cdot 2 \\
 \hline
 \qquad \qquad \qquad 18476 \\
 \qquad \qquad \qquad 46190 \\
 \hline
 \qquad \qquad \qquad 55428 \\
 \hline
 \qquad \qquad \qquad 602 \cdot 3176 \text{ Ans.}
 \end{array}$$

(8) $\cdot 0729)2 \cdot 8907,21926$ See the rule given in *Civil Service Arithmetic*, page 98.

$$729) 28907,21925 \text{ (39} \cdot 65325 \text{ Ans.}$$

$$\begin{array}{r}
 2187 \\
 \hline
 7037 \\
 6561 \\
 \hline
 4762 \\
 4374 \\
 \hline
 3881 \\
 3645 \\
 \hline
 2369 \\
 2187 \\
 \hline
 1822 \\
 1458 \\
 \hline
 3645 \\
 3645 \\
 \hline
 \hline
 \end{array}$$

$$(9) \quad \frac{5s. \ 3d.}{£7} = \frac{9}{7 \times 240} = \frac{\cdot 9}{24} = \frac{\cdot 225}{6} = \cdot 0375 \text{ Ans.}$$

$$\begin{aligned}
 (10) \quad & 2) \ 5, 14, \ 8, \ 35 \\
 & \qquad \qquad \qquad 7 \times 4 \times 35 \times 2 = 280 \text{ Common Denominator.} \\
 & 21 + \frac{56 + 260 + 35 + 8}{280} = 21 \frac{359}{280} = 22 \frac{79}{280} \text{ Ans.}
 \end{aligned}$$

$$(11) \quad 100\frac{3}{8} - 34\frac{9}{20} = 100\frac{15}{40} - 34\frac{18}{40} = 65\frac{27}{40} \text{ Ans.}$$

$$\begin{aligned}
 (12) \quad & 8\frac{2}{3} \times 45\frac{25}{37} \times 1\frac{1}{13} \times \frac{81}{130} \times \frac{1}{14} \\
 & = \frac{74}{9} \times \frac{180}{37} \times \frac{14}{13} \times \frac{81}{130} \times \frac{1}{14} = 18 \text{ Ans.}
 \end{aligned}$$

$$(13) \quad 8\frac{3}{21} \div 5\frac{1}{7} = \frac{\overset{19}{\cancel{171}}}{\underset{3}{\cancel{21}}} \times \frac{\overset{7}{\cancel{7}}}{\underset{4}{\cancel{28}}} = \frac{19}{12} = 1\frac{7}{12} \text{ Ans.}$$

$$(14) \quad \begin{array}{r} 1\cdot35 \text{ furlong} \\ 40 \\ \hline 54\cdot00 \text{ poles} \\ 5\frac{1}{2} \\ \hline 270 \\ 27 \\ \hline 297 \text{ yards ; to which add } 7\cdot32 \\ 7\cdot32 \\ \hline 304\cdot32 \\ 3 \\ \hline 912\cdot96 \text{ feet Ans.} \end{array}$$

$$(15) \quad \begin{array}{r} \cdot65 \text{ of a week.} \\ 7 \\ \hline 4\cdot55 \text{ of a day.} \\ 24 \\ \hline 109\cdot20 \text{ of an hour ; from which take } 2\cdot32 \\ 2\cdot32 \\ \hline 106\cdot88 \text{ hrs.} \quad 106 \text{ hrs.} = 4 \text{ days } 10 \text{ hrs.} \\ 60 \\ \hline 52\cdot80 \text{ minutes.} \\ 60 \\ \hline 48\cdot00 \text{ secs.} \end{array}$$

$\therefore \text{Ans.} = 4 \text{ days } 10 \text{ hrs. } 52' 48''$

$$(16) \quad \begin{array}{r} 380\cdot73 \\ \cdot0725 \\ \hline 190365 \\ 76146 \\ \hline 266511 \\ \hline 27\cdot602925 \text{ Ans.} \end{array}$$

$$\begin{array}{r}
 (17) \quad 73) 7036 \text{ (96-3836)} \\
 \underline{657} \\
 466 \\
 \underline{438} \\
 280 \\
 \underline{219} \\
 610 \\
 \underline{584} \\
 260 \\
 \underline{219} \\
 410
 \end{array}$$

It will be observed that 6 in fourth place is more accurate than 5.

$$\begin{aligned}
 (18) \quad \frac{2 \text{ cwt. } 3 \text{ qrs. } 14 \text{ lbs.}}{1 \text{ ton } 10 \text{ cwt.}} &= \frac{11 \text{ qrs. } 14 \text{ lbs.}}{30 \times 112} = \frac{\overset{23}{\cancel{322}}}{30 \times \cancel{112}} \\
 &= \frac{2 \cdot 3}{3 \times 8} = \frac{2875}{3} = \cdot 0958\bar{3} \text{ Ans.}
 \end{aligned}$$

$$\begin{array}{r}
 (19) \quad \begin{array}{rcl} \text{lbs.} & \text{ozs.} & \text{dwts.} \\ 15 & 13\frac{1}{2} & 12 \\ \underline{12} & & \\ 193\frac{1}{2} & \text{ozs.} & \\ \underline{20} & & \\ 3882 & \text{dwts.} & \\ \underline{4} & & \\ 15528 & & \\ \underline{6} & & \\ 93168 & \text{grs.} & \text{Ans.} \end{array}
 \end{array}$$

$$\begin{array}{r}
 (20) \quad \begin{array}{rcl} \text{tons} & \text{cwt.} & \text{qrs.} & \text{lbs.} \\ 7 & 3 & 3 & 16\frac{4}{5} \\ & & & \underline{5} \\ 35 & 19 & 2 & 0 \\ \underline{20} & & & \\ 719 & & & \\ \underline{4} & & & \\ 2878 & & & \end{array} \quad \begin{array}{rcl} \text{ton.} & \text{£} & \text{s.} & \text{d.} \\ : 1 & :: & 239 & 6 & 6 \\ \underline{20} & & & & 8 \\ 20 & 1914 & 12 & 0 \\ \underline{4} & & & 10 \\ 80 & 19146 & 0 & 0 \end{array}
 \end{array}$$

$$\begin{array}{r}
 1439 \quad 19146 \\
 9573 \quad (6 \\
 \hline
 8634 \\
 939 \\
 20 \\
 \hline
 18780 \quad (13 \\
 18707 \\
 \hline
 73 \\
 12
 \end{array}$$

$$\therefore \text{Ans.} = £6 \quad 13 \quad 0 \frac{876}{1439}$$

(21)

$$\begin{array}{r}
 \begin{array}{c} £ \quad s. \quad d. \\ 731 \quad 14 \quad 6 \end{array} \\
 10s. = \frac{1}{2} \text{ of a } £ \quad \left| \begin{array}{r} 365 \quad 17 \quad 3 \\ 91 \quad 9 \quad 3\frac{1}{2} \\ 60 \quad 19 \quad 6\frac{1}{2} \end{array} \right. \\
 2s. 6d. = \frac{1}{4} \text{ of } 10s. \\
 1s. 8d. = \frac{1}{5} \text{ of } 10s. \\
 \hline
 £518 \quad 6 \quad 1\frac{1}{4} \text{ Ans.}
 \end{array}$$

(22)

$$\begin{array}{r}
 260 \\
 1040 \\
 \text{Ans.} = \frac{1040}{100} \times \frac{25}{1} \times \frac{3}{1} = £780
 \end{array}$$

(23)

$$\begin{array}{r}
 9) 5432762 \text{ sq. ft.} \\
 \hline
 603640 \dots 2 \text{ sq. ft.}
 \end{array}$$

$$\begin{array}{r}
 4 \\
 11) 2414560 \\
 \hline
 11) 219505 \dots 5 \\
 4,0) 1995,5 \dots \frac{5}{4} = 1 \text{ yd. } 2 \text{ ft. } 36 \text{ in.} \\
 4) 498 \dots 35 \text{ pls. } 2 \text{ sq. ft.} \\
 124 \text{ ac. } 2 \text{ rds. } 35 \text{ pls. } 1 \text{ yd. } 4 \text{ ft. } 36 \text{ in.}
 \end{array}$$

(24) The reason of the following statement is evident,

$$\begin{array}{rcl}
 20 & : & 17 :: 1 \text{ Field.} \\
 8\frac{1}{2} & : & 50 \\
 10 & : & 8 \\
 2 & : & 1
 \end{array}$$

$$\therefore \text{Ans.} = \frac{17 \times 50 \times 8 \times 2}{20 \times 10 \times 17 \times 8} = 2 \text{ fields.}$$

* See *Civil Service Arithmetic*, p. 155.

(25)
$$\begin{array}{r} 2 \text{ tons } 5 \text{ cwt. } 3 \text{ qrs. } 3\frac{1}{2} \text{ lbs. at } £3 \text{ } 13\text{s. } 6\text{d.} \\ 20 \hspace{10em} [\text{per cwt.}] \\ \hline 45 \quad 3 \quad 3\frac{1}{2} \\ 1 \quad 5 \quad 2\frac{1}{2} \\ \hline 45 \quad 15 \quad 7\frac{1}{2} \text{ at } £1 \text{ per ton.} \\ 3 \\ \hline 137 \quad 6 \quad 10\frac{1}{2} \\ 22 \quad 17 \quad 9\frac{3}{4} \\ 7 \quad 12 \quad 7\frac{1}{2} \\ 0 \quad 7 \quad 7\frac{1}{8} \\ \hline 168 \quad 4 \quad 11\frac{1}{8} \text{ Ans.} \end{array}$$

$10\text{s.} = \frac{1}{3} \text{ of } £1$
 $3\text{s. } 4\text{d.} = \frac{1}{3} \text{ of } 10\text{s.}$
 $2\text{d.} = \frac{1}{20} \text{ of } 3\text{s. } 4\text{d.}$

(26)
$$\text{Interest for 1 year} = \frac{125}{1000} \times \frac{15}{4} = \frac{1875}{16}$$

$\therefore \text{Ans.} = (£3681 \text{ } 12\text{s. } 9\frac{3}{4}\text{d.} - £3125) \div \frac{1875}{16}$

$$= £556 \text{ } 12\text{s. } 9\frac{3}{4}\text{d.} \times \frac{16}{1875} = \frac{£1781 \text{ } 5\text{s.}}{1000} = \frac{1000}{1000} = 1 \text{ year.}$$

$$= \frac{£71 \text{ } 5\text{s.}}{15} = \frac{445}{15} = 29\frac{2}{3} \text{ years.}$$

(27)
$$\begin{array}{r} 3 \text{ cwt. at } £16 \text{ } 16\text{s.} = £50 \text{ } 8\text{s.} \\ 1 \text{ cwt. at } £19 \text{ } 12\text{s.} = £19 \text{ } 12\text{s.} \\ \hline £70 \text{ } 0\text{s.} \end{array}$$

Now $100 : 104 :: \frac{£70}{448}$

$\therefore \text{Ans.} = \frac{104 \times 70 \times 20\text{s.}}{448 \times 100} = 3\text{s. } 3\text{d.} \text{ Ans.}$

$$(28) \quad 450 \text{ cubic feet } 1088 \text{ inches} = 778688 \text{ inches}$$

$$\therefore \text{Ans.} = \sqrt[3]{778688} = 92 \text{ in.} = 7 \text{ ft. } 8 \text{ in.}$$

$$(29) \quad \text{First and third class in Great Britain and Prussia} \\ = 21409210 + 2374230 + 4743210 + 307490 = 28834140$$

$$\text{Whole second class} = 10291740 + 6172420 + 1292470 \\ = 17756630$$

$$\therefore \text{Ans.} = \frac{17756630 \times 100}{28834140} = 61.5819 \dots$$

$$(30) \quad \text{Since } \cdot 9 = 1 \text{ we have}$$

$$\begin{aligned} \text{Ans.} &= 5.5 \times \cdot 03 \frac{18}{99} \times \frac{47619}{90909} \times \frac{25 \times 21}{20 \times 4} \text{ £} \\ &= \frac{11 \times 25 \times 47619 \times 5 \times 21}{2 \times 1100 \times 90909 \times 4} \text{ £} = \frac{7}{32} \text{ £} = 4s. \ 4\frac{1}{2}d. \end{aligned}$$

In order to afford Candidates for the Excise some practice in Arithmetic, in addition to working a good treatise on the subject the following Papers, (one of which the learner is recommended to work every morning,) have been prepared.

I.

Time—half an hour.

You are recommended not to look at the Answers until you have worked the whole Paper.

1. Reduce 7698547 drs., avoirdupois, to tons, cwts., &c.
2. Add together $37\frac{7}{11}$, $59\frac{9}{11}$, $13\frac{4}{5}$, and $91\frac{6}{5}$.

3. From $39\frac{47}{87}$ take $19\frac{1}{18}$.
4. Bring 11 seconds to the decimal of an hour.
5. If 17 men earn £12 15s. in 4 days, working $7\frac{1}{2}$ hours a day, what sum should 28 men earn in 12 days, working $8\frac{1}{2}$ hours per diem.
6. Russian 5 per cent. stock issued at 75 per cent. is now at $1\frac{1}{8}$ premium, and brokerage $\frac{1}{4}$ per cent. ; how much must a person invest in this stock to secure an income of £276 5s. ?

II.

You are recommended not to look at the Answers until you have worked the whole Paper.

1. Reduce 777993 pints to quarters, and find (by Practice) the value of the result at £2 2s. 8d. per quarter.
2. Add together 99·187, 9918·7, 9·9187, 991870, ·099187.
3. From 110·235 take 59·0097.
4. Find the value of $\frac{1}{3}\frac{9}{8}$ of £1 13s. 4d. ·0275 of £8 6s. 8d. + $\frac{1}{13}$ of £2 1s. 8 $\frac{1}{2}$ d.
5. If 2 qrs. 22 lbs. of pork cost £1 14s. 1 $\frac{1}{2}$ d., find the cost of 9 tons 9 cwt. 3 qrs. 27 lbs.
6. If I invest in the 3 per cents. at 72, and on their rising to 80 sell out and invest the proceeds in a 4 per cent. stock at 96, thereby increasing my income £43 10s. ; find the sum at first invested.

III.

Time—half-an-hour

You are recommended not to look at the Answers until you have worked the whole Paper.

1. Add $\frac{5}{7}$ of 79 cwt. 3 qrs. 21 lbs. to $\frac{1}{18}$ of 248 cwt. 2 qrs. 8 lbs., and give the result in lbs.

2. A carpenter is paid 32*s.* a week, of 8 hours to the day ; he remains idle on Monday, and only works 3 hours on Tuesday ; find his wages for this week.
3. Multiply 77.075 by 19.0603.
4. Divide 5764.3 by 62.50.
5. If 5 silver ornaments each weighing 12 ozs., cost 5*s.* 2*d.* an oz. for the silver, and 3*s.* 4*d.* an oz. for workmanship ; find the value of 8 ornaments weighing 72 ozs. of same silver, the cost of the workmanship being doubled.
6. The gross receipts of a railway company in a certain year are apportioned as follows :—41 per cent. to pay the working expenses, 56 per cent. to give the shareholders a dividend at the rate of $3\frac{1}{2}$ per cent. on their shares, and the remainder, £15,000, is reserved : find the paid up capital of the company.

IV.

Time—half-an-hour.

You are recommended not to look at the Answers until you have worked the whole Paper.

1. Add together £875, 1.125 of 16*s.* 8*d.*, and .8 of 5*s.*
2. Add together $19\frac{7}{10}$, $25\frac{9}{10}$, $17\frac{1}{10}$, and $5\frac{3}{10}$, and take the sum from $75\frac{1}{10}$.
3. Divide £86 13*s.* 4*d.* by .0125.
4. Find the simple interest on £635 16*s.* 8*d.* for 5 years, at $6\frac{2}{3}$ per cent. per annum.
5. The poles of a telegraph wire are 33 feet apart ; if a railway passenger pass each in 2 seconds, find the rate per hour at which the train is travelling.
6. A person invests his capital in the 3 per cents. at 90, he sells out at £96 and invests in 4 per cent. railway shares at par, thereby increasing his income £350 per annum ; find sum at first invested.

V.

Time—half-an-hour.

You are recommended not to look at the Answers until you have worked the whole Paper.

1. Reduce 3 acres 1 rood 12 poles 3 yards to square inches.
2. From $\cdot 375$ of 5s. 6d. take $\cdot 385$ of 5s. 2d.
3. Find dividend on £37055 13s. 4d. at 7s. $7\frac{1}{2}$ d. in the pound.
4. Find the cost of carpeting a room 25 feet long and 14 feet 6 inches wide with carpet 2 feet 6 inches wide, at 2s. $10\frac{1}{2}$ d per yard.
5. Bring 675947 pints to quarters, and find (by Practice) the value of the result at £1 17s. 4d. per quarter.
6. How many pounds of tea at 2s. 8d. per pound must a grocer mix with 495 lbs. at 2s. 9d., so that he may realize a profit of £10 per cent. on his outlay, by selling the whole at 3s. a pound?

VI.

Time—40 minutes.

You are recommended not to look at the Answers until you have worked the whole Paper.

1. Reduce 579325 cubic inches to cubic yards.
2. Reduce $\frac{1}{3}\frac{5}{8}$ of 6s. 8d. to the decimal fraction of £50.
3. The difference between the discount on a certain sum due 3 months hence at 5 per cent, per annum, and the interest of same sum for same time is 4d. ; find the sum.
4. If the shadow of a tree 30 feet 6 inches high be $91\frac{1}{2}$ feet ; what should be the height of a tree whose shadow is 59 feet?

5. A ditch is being dug at the rate of 81 feet per day by 54 men ; after 13 days' work 8 of them are replaced by boys, and the work goes on for 11 days more, at the end of which the whole length dug is 1889 feet ; how much work per day do the boys do ?
6. A man invests £1,638 in the 3 per cents at 91, and sells £1,600 stock when they have risen to $93\frac{1}{2}$, and the remainder when they have fallen to 85 ; how much does he gain or lose by the transaction ?
7. Find the cube root of $1157\frac{5}{8}$.
8. By selling goods at £5 5s. 6d. per cwt., $5\frac{1}{2}$ per cent. is gained ; find how much per cent. will be gained by selling them at 3s 2d. per lb.

ANSWERS.

I.

- | | |
|---|----------------------------------|
| (1) 13 tons 8 cwts. 2 qrs. 7 oz. 3 drs. | (2) $121\frac{1}{3}$. |
| (3) $19\frac{4}{7}$. | (4) .00305. |
| (5) £71 8s. | (6) £4219 14s. $4\frac{1}{2}$ d. |

II.

- | | |
|---|------------------------------|
| (1) 1519 qrs. 4 bus. 1 gal. 1 pt:
£3241 12s. 9d. | (2) 1001897·904887. |
| (3) 51·2253. | (4) £3 5s. $2\frac{1}{2}$ d. |
| (5) £465 9s. $6\frac{3}{4}$ d. | (6) £9396. |

III.

- | | |
|-------------------|-----------------|
| (1) 25535 lbs. | (2) £1 3s. 4d. |
| (3) 1469·0726225. | (4) 92·2288. |
| (5) £42 12s. | (6) £8,000,000. |

IV.

- | | |
|----------------|-------------------------|
| (1) £2 0s. 3d. | (2) $7\frac{61}{888}$. |
|----------------|-------------------------|

(3) £6933 6s. 8d.

(4) £211 18s. 10 $\frac{2}{3}$ d.(5) 11 $\frac{1}{4}$ miles.

(6) £37500.

V.

(1) 20860416 inches:

(2) .88d.

(3) 14127 9s. 5 $\frac{1}{2}$ d.(4) £6 18s. 11 $\frac{1}{2}$ d.(5) £2464 7s. 9 $\frac{5}{8}$ d.(6) £185 $\frac{5}{8}$ lbs.

VI.

(1) 12 c. yds. 11 ft. 445 in.

(2) .003125.

(3) £108.

(4) 19 feet 8 in.

(5) 7 feet a day.

(6) £28 gain.

(7) 10 $\frac{1}{2}$.(8) 254 $\frac{2}{3}$.

ENGLISH COMPOSITION.

DIRECTIONS.

In this exercise attention is to be paid to handwriting, orthography, punctuation, and style.

Your Essay should fill not less than two folio pages.

You must only attempt **one** of the following:—

I. A description of any county in the United Kingdom.

II. Photography; or,

III. The writings of **one** of the following:—

Macauley, De Foe, Johnson, Thackeray, Sir W. Scott, Goldsmith.

We have already spoken of handwriting and orthography. We shall now speak of punctuation:—

PUNCTUATION.

Punctuation is the art of marking the clauses and sentences of written language by points or stops which indicate the pauses required in order to convey the sense intended correctly.

The following rules have been found extremely useful, and can be recommended to the learner as sufficient to ensure for him, where rightly applied, almost absolutely correct punctuation. Let him take up any carefully written book, mark its pauses, and see in every instance the rule given below with which they are in conformity. After a short time he will not only be able to punctuate with sufficient accuracy, but also to give the reason why he inserts each pause in a certain place.

“The comma is used to separate those parts of a sentence which, though very closely connected in sense and construction, require a short pause between them.”

I. All the simple members or clauses of a compound sentence should be separated from each other by *Commas*.

II. A simple sentence requires no pause except at the end.

III. When a parenthetical, relative or explanatory clause is introduced into a simple sentence, a Comma must be inserted before and after it.

IV. A *Comma* is often used to render words more emphatic, to separate words occurring in pairs connected by a conjunction, to separate appositional phrases, introductory words and phrases, and subordinate clauses from the remainder of the sentence.

The SEMICOLON divides a compound sentence into parts less closely connected than those separated by *Commas*.

I. A *Semicolon* is used to separate two clauses of a sentence, the first being complete in itself, and the second added as an inference, or to give some explanation.

II. It is also used when a sentence contains an enumeration of several particulars.

III. If a sentence consist of several members having a dependence on each other, or on some common clause, and each forming a distinct proposition, a *Semicolon* should separate them.

The COLON makes a more distinct pause than a *Semicolon*.

I. A *Colon* is inserted when a member of a sentence so complete that a full stop might be used, is followed by another containing some additional observation or illustration.

II. When several Semicolons are used (under Rule III), and the sense suspended until the last clause, a *Colon* should be used before this clause.

III. A *Colon* should be inserted also when a quotation, or a speech, is formally introduced, unless when the word *as* or *namely* is used.

A PERIOD is used when a sentence is complete both in sense and construction.

A NOTE OF INTERROGATION (?) is used when a question is asked.

A DASH (—) is used when an abrupt turn comes in a sentence. Many writers use this stop instead of a parenthesis.

A NOTE OF EXCLAMATION (!) is used after expressions of sudden emotion, terror, surprise, &c., and also after solemn or emphatic invocations, or addresses.

A PARENTHESIS () distinguishes some clause in the body

of a sentence, which may be omitted without affecting either the sense or grammatical construction.

The APOSTROPHE. Indeed many learners treat the insertion of an Apostrophe in its proper place as a matter of the utmost indifference, considering it one of those niceties which they with safety may overlook. As a confirmation of the carelessness with which an Apostrophe is generally looked upon, it may be mentioned that in fifteen exercises lately examined only four wrote the Apostrophe correctly. Some fall into the more serious error of putting an Apostrophe with every word ending with *s*, and write such words as theirs either their's or theirs'; such words as goslings, in a similar manner, either gosling's or goslings'. This must be carefully guarded against, and the Apostrophe only inserted to indicate or point out the possessive case.

In singular nouns always insert the Apostrophe before the *s*; as, a man's house.

In plural nouns when the plural form is a different word from that used in the singular, the Apostrophe is also placed before the *s*; as men's hats. In every other case the Apostrophe is after the *s* of plural nouns; as angels' visits. We write, for goodness' sake, for conscience' sake, the witness's testimony, a sheriff's bailiff, two sheriffs' bailiffs, &c., &c.

STYLE.

Under this head we are to point out some of the most important qualities, characteristic of good writing; and always found in it to a greater or less extent; and also to explain, and illustrate the defects and vices arising from the absence of these qualities. The most important general

characteristics of a good style, are the following—perspicuity, purity, conciseness, plainness, force, euphony or smoothness, and dignity. The faults opposed to these are obscurity, barbarism, diffuseness, excessive ornament, or ornateness, weakness or puerility, harshness or vulgarity. We shall take up these points in the order in which they have been mentioned, which may be regarded as the order of their importance. Certainly the first requisite of a good style, whether in writing or speaking, is perspicuity; and the greatest and most unpardonable fault in style, is that of obscurity. It is scarcely necessary to illustrate this. The chief object both of speaking and of writing is to be understood; if we fail in this particular, we had better have remained silent. If our language be not intelligible, it can hardly possess any other good quality; but any such quality that it may have, is entirely wasted. Who can tell whether you have expressed yourself as briefly, as forcibly, or as plainly, as the nature of the matter in hand would permit, if he does not know what you intend to say. And who is likely to read through page after page of obscurities constantly in search of a meaning that can only be discovered by a most painful effort, even if it be really worth discovering? The bad policy displayed in all kinds and degrees of obscurity of style is so evident, that one might expect the first efforts of every young writer would be directed towards the complete eradication of this fault from his literary performances. Yet, such is far from being the case, putting aside those instances in which obscurity in style arises from simple ignorance, inexperience, carelessness, or confusion of thought, we often find it permitted to disfigure the works of practised writers, probably arising from the excessive

attention paid to some other point, supposed to be of equal, if not greater importance; some "literary hobby" to which everything else is sacrificed. Indeed, it would be easy to name distinguished authors who have been systematic offenders in this point, perhaps from an idea that obscurity rendered their utterances more interesting, or imparted to them an air of importance. But though we may in some rare cases pardon a great genius, a man who has something truly original to say for his obscurities or affectations, it will not do for ordinary people to imitate him. Even in a great writer obscurity of every kind is a serious fault; in a small one it is fatal. Obscurity arises from two causes, or two classes of causes, namely—confusion of thought, and confusion or ambiguity of language. Of course, either or both of these may be at work in any particular instance; indeed one often produces or aggravates the other.

At present we shall only offer a few remarks on two points immediately connected with perspicuity, namely—propriety, and precision of language. These are the two essentials of perspicuity. It is possible to write an impure or un-idiomatic style, to be somewhat too concise, or somewhat too diffuse; to be extremely complex in construction, or extremely ornate, or bombastic in diction; and yet to make your meaning perfectly clear. But you cannot do this without propriety and precision in the use of language, without using such words as express your meaning fully and completely, but express nothing more.

Propriety of diction is often confounded with purity. But the two things are quite distinct. Purity of style consists in the use of such words and constructions as belong to, or are consistent with the idiom of the language in which

we write, to the exclusion of all others. But all this may be attended to without securing propriety of diction, which consists in the selection of words appropriate to those ideas which we intend to convey. These, of course, are in general the words which have been *appropriated* or set apart for the expression of the particular ideas, by the usage of good writers. It is plain that a man may avoid the use of all words and idioms that are not English, without using the right words to express his thoughts. It constantly happens, however, that many young men who can write grammatically, and construct their sentences with some skill, fail altogether in the attempt to choose the right word for a particular idea, or perhaps do not make any such attempt at all, and are not aware that the thing requires an effort. This is especially the case when the ideas to be expressed lie out of the ordinary channel or course of thought which the writer has been accustomed to hear expressed in conversation; or when he wishes to avoid colloquial language and does not know what to put in its place.

It sometimes happens that a person who has perfectly clear and distinct ideas, is more or less incapable of expressing them in intelligible language, but either has really nothing to say, or at least really never manages exactly to find out what it is he wishes to express. This latter fault is in some respects worse than the former, and is generally harder to get rid of; but it is no part of our present plan to enter into the consideration of it, or of the remedies for it. Indeed, to do so, would require a distinct treatise. Confusion, or indistinctness in thought is always an indication of mental poverty or want of cultivation of some kind or other. But the varieties of intellectual shortcomings and defects of education

are innumerable, and would open up a field too wide for us to enter on. It is enough to remind the learner that it is useless for him to attempt writing until he has something definite to say; knows exactly what that something is, and has arranged his thoughts in such a way as to make them, each and all, as well as their connections, intelligible to other people. With regard to obscurity of language or expressions, properly so called, we must observe in the first place, that various other faults of style, may, in different cases, contribute to produce it. It may arise either from undue diffuseness, or excessive brevity. It may be occasioned by extreme complexity in the construction of a sentence, or by simple impurity of diction. It is very often the result of an improper collocation of words or clauses.

Poverty of Vocabulary, in a word, is one of the most common, as it is one of the most serious defects exhibited by novices in the art of composition. This, joined to ignorance of the exact meanings of many words with which they are familiar, will account for most of their violations of the rules of Propriety. These faults can be overcome only by the careful study of good authors.

In a treatise like the present it is unnecessary to pursue this subject further. Those who desire more information on this point we must refer to our treatise on *English Composition and Essay-Writing*, in which numerous essays on a great variety of subjects are to be found.

WORK.

The student should set apart a certain number of hours each day for regular and systematic work. It is not necessary to divide his time into half hours, and to change his subject every half hour like a school-boy ; for often he will have only entered on a certain subject when his half hour has expired, and should he change to another the time already spent at this subject is, to a certain extent, lost. When the mind is vigorous is the time to work : when the mind is sluggish or inactive, work, as a rule, makes no lasting impression, and a smart walk or some exhilarating mental or bodily exercise will tend to bring the mind to its wonted activity.

Dr. Joyce, in his "*How to Prepare for Civil Service Competition under the New Regulations*," says—"We must not indeed undervalue the vast advantages of natural ability ; but no amount of talent will render unnecessary serious and persevering work. There are thousands of people endowed by nature with intellects capable of the highest achievements, who, nevertheless, pass through life worthlessly, blinded by the fatal delusion that the possession of natural gifts exonerates a man from laborious application. It is one of the commonest things in the world that medium abilities, united with persevering labour, accomplish more than the most commanding talents counteracted by an indolent disposition."

TOTS.

(1)			(2)			(3)		
£	s.	d.	£	s.	d.	£	s.	d.
849673	16	4	774103	7	3	33176	19	1
32	1	3	211	6	8	899217	16	7
783130	2	4	425043	12	0	221129	10	7
947890	0	1	203	1	9	51427	12	10
889416	19	8	914376	15	2	399	5	4
431067	9	8	215	19	1	419732	13	7
64239	2	5	862935	8	1	796904	17	9
756409	11	9	449603	2	5	43199	16	10
752	11	8	6408	19	7	634328	16	8
841263	9	5	813214	2	6	373051	2	9
134131	6	5	398136	19	6	853748	17	9
13257	8	6	133925	4	2	731528	8	9
93276	5	9	77	2	11	3078	4	11
4636	0	11	691	11	9	371140	15	11
31287	14	7	791414	2	4	840563	19	9
52350	17	5	981	3	2	891195	9	8
391	8	7	881528	13	6	73109	12	4
32752	11	3	408	11	4	329	14	9
412356	1	2	234526	1	9	835	0	6
866197	9	8	729374	5	7	769276	17	8
6416	9	4	707319	18	9	973617	3	7
672	1	9	131619	10	10	851397	17	10

TOTS.

(4)			(5)			(6)		
£	s.	d.	£	s.	d.	£	s.	d.
19763	4	4	74103	16	2	413176	13	1
31232	1	3	50211	6	8	811217	1	8
183139	2	4	125043	9	3	29	0	7
947890	0	11	49203	1	1	614275	8	1
39416	9	8	14376	11	3	86391	4	10
531067	19	8	29215	7	5	410732	1	2
239	2	5	962935	8	9	106904	7	2
756509	0	2	649603	2	5	99	11	10
752	3	3	498	1	1	434321	18	6
941263	9	4	823214	12	6	373041	2	7
234139	18	5	136398	19	8	153748	15	4
313247	8	8	925	4	2	431526	3	1
63276	5	9	63177	2	9	911397	7	1
636	12	4	14691	13	9	971140	15	4
31287	14	7	91414	19	4	410563	17	7
52350	17	8	82971	3	2	95	2	1
10397	14	9	981528	3	6	23109	8	7
32752	15	3	6408	13	0	74321	18	0
12356	1	2	234526	1	10	811835	0	6
466197	11	6	329374	15	7	769276	13	3
826416	9	7	319	4	10	173617	6	2
77	1	10	89316	7	8	397	11	7

ANSWERS.

£	s.	d.	£	s.	d.	£	s.	d.
(1) 7211600	19	11	(2) 8256319	0	1	(3) 9832390	15	5
(4) 5494409	4	10	(5) 4809457	5	10	(6) 7981218	8	1

SPECIMENS OF ESSAYS.

In the usual din and excitement of an examination few candidates can arrange their thoughts upon a subject with sufficient distinctness. We give the following essays of successful candidates, not because of their excellence, but to show what may fairly be expected by the examiners.

THE LIBERTY OF THE PRESS.

Given 23rd May, 1871. Time 2 hours.

One of the greatest (if not the greatest) characteristics of the age in which we live is the liberty of speech at which the press of this kingdom has arrived. Freedom of speech is the undeniable right of every Briton; and the press has claimed for itself and obtained equal liberty of speaking, as it was once expressed, truth to the people in the hearing of the king, and to the king in the hearing of the people. The value of this liberty cannot be too highly estimated. Without it England could never have attained to the proud eminence she has. It serves to show the people their weakness—and often the weakness of the State—and by pointing out defects thus enables them to insist upon the adoption of such measures as will uphold our ancient prestige. Session after session we have before us the debates on all the great questions before Parliament—a vast difference from the times not far remote, in which only garbled and incomplete reports, very often one-sided, could be had.

It is rather curious to look back and observe how the liberty of the press has advanced until it has become, if we may so use the term, the handmaiden of the liberty of the subject. It has grown with our Constitution until it has

become inseparably entwined with it, and we cannot interfere with the one without endangering the other.

Although we are advocates for the liberty of the Press, we would insist upon a strict censorship being held over it, in order to preserve it from running into extremes. In times of political excitement this censorship ought to be ever on the watch; for then, the minds of the people being inflamed, a stray spark can do incalculable harm. By referring to past years in the history of Ireland, we have too many instances of the truth of this. We have seen how the minds and passions of the unhappy people have been worked upon by the teachings of some of those so-called national journals—which no doubt have an object of their own in view in acting thus—until they are excited to such a degree, that acts of bloodshed and violence are the inevitable consequences, and the poor deluded victims fall before the justly offended law. A strong hand should be held over such publications; it is the bounden duty of every Government to do so. We would also hold a strict hand over private animadversions; that is remarks on private individuals tending to hurt or wound their feelings. The Law deals with cases of this sort: and it is in the power of every one to defend himself from such cowardly attacks.

Nothing can show with greater effect the advantages of liberty to the press than a glance at the disadvantage which must arise from having a servile or scycophant one. In former times there were cases where the press was silent during corrupt administrations—when it could not speak, or what was worse, would not speak—until the resources and the very life-blood of the country had been wasted away and consumed. We may well be thankful that such

times are gone, never more, we hope, to return. We now live under a mild and gracious Sovereign, guided by a wise and virtuous ministry, who are themselves guided by experience, and know full well that if they wish to preserve the State, one of the most effectual ways is to continue intact the liberty of that great sentinel and monitor of the people—the Press.

S.

THE LOSS OF HER MAJESTY'S SHIP CAPTAIN.

Given 28th Feb., 1871. Time 2 hours.

No event since the death of the lamented Prince Consort has cast such a gloom over the whole of Great Britain as the loss of the Captain. The nation mourned and wept with the relatives and friends of those whose graves were far away; away where their friends would never have the consolation of erecting memorials over them:—for in the Bay of Biscay they lie buried beneath fathoms of the ocean's waters.

“The Captain with all hands went down in the Bay of Biscay.” Such were the brief but dreadful tidings which flashed through the telegraph wires, and which were read by all with sorrow: by the relatives of those who were lost; with that intense sorrow, and overwhelming grief, which some terrible loss alone can excite; by the builders and designers of the vessel with awe and fear; and by the nation at large as the intelligence of any national calamity should be read—with grief and surprise at the mysterious ways of Providence.

The Captain was one of the few vessels of the English

Navy, built according to the new inventions. About 550 souls were on board when she sailed on her trial voyage; on the voyage which was to decide if the style of turret-ship building was to be introduced into the English Navy. The builders and the nation in general did not for a moment imagine that their pride, and the pride of the English Navy, was a doomed ship. They thought if hard pressed by a storm she would make a better struggle than she did; and never imagined that she would go down like a stone, in a squall. The laughing hundreds who in two short weeks after were widows, orphans, or friendless, did not dream that they gazed for the last time on those they loved.

Everything being ready, all embarked, and the noble-looking vessel steamed out of the harbour amidst the cheers and blessings of thousands. She was never to return, and the crew little thought that they gazed for the last time on the land of their birth.

All went on smoothly and nothing occurred that could in any way indicate to the crew of fortune-hunters, and pleasure-seekers the dreadful fate that awaited them. Every day pleasure and revelry became more and more the object of the crew.

One night after the feasting and pleasures of the day were over, the Captain encountered a storm and made for the land in order to shelter his vessel in some friendly bay. She was in the Bay of Biscay, nearing the coast of Spain, when a squall met her and threw her on her side. Then commenced a scene which no tongue can fully describe or pen narrate. All the crew were asleep when the shock awoke them: throwing on a few articles of dress they rushed to the deck in order to save themselves. There the scene was terrific and

appalling. Wives clung to their husbands, and children to their parents. Save us! Save us! was their universal cry. Life was dear now, life in any form, for they were not prepared to die. The thoughts of debauchery and revelry were all forgotten now; and the great thoughts of eternity arose before their minds. Some were about to save themselves by means of the boats, and some by means of planks and spars, but there was no time for the launching of the boats, or jumping overboard with the planks, for the ship suddenly capsized and went down bottom uppermost. All were now immersed in the water and their efforts to save themselves were redoubled. All was unavailing, for all went down save *one* who survived to tell the story of their fate. A lamentable fate it was, and like the crew of the Royal George they will be ever remembered by their fellow-countrymen.

After the grief occasioned by the event was over several discussions arose as to the cause of the loss of the ship. Some say the cause of her going down was that she was built too high, and the weight of her decks made her unsteady. Be this as it may very few imagined that it would be as it happened, that is, that the Captain would become a wreck.

Some of our more feeling fellow-countrymen got up a fund for the relief of those whose supporters perished with the Captain. The fund is now progressing favourably and it is my earnest wish that it may continue to do so, in order that it may in some way assuage the grief of the poor sufferers; for no one can tell the sorrow which is felt at the loss of a dear friend until he has had experience of it.

M.

ORGANIZATION.

Given January 30th, 1871.

It would be scarcely possible for us to conceive a world uninfluenced by this most essential principle. It would be equally futile for us to attempt to describe the condition of a world so constituted. What imagination, what powers of description, would we need so as to enable us to pourtray the almost indescribable confusion resulting from such a state of affairs. In the wide realms of nature we find everything created on a highly and wonderfully organized plan; far more perfect than any that man's inventive genius ever led him to produce. It is necessary that every body having many members should be in a high state of organization; such that each member be, to a certain extent, dependent on the other for support, and at the same time capable of independent action, whilst all should be so constituted as to work harmoniously together as a whole. Now such a body, having many members, is the human form; in its complex organs we have a wonderful instance of that truly perfectly organized system which pervades the universe. Here, each member possesses the power of either acting by itself or of co-operating with the others to act as if they formed but a single body. In the Army and Navy of any country a very high state of organization is absolutely necessary in order to secure their thorough efficiency when called into active service. We may fairly say that the numerous and disastrous defeats sustained by the French armies have been caused, in no small degree, by their want of a thoroughly organized military system. On the other hand, there can be but little doubt that to their splendid

system of Military organization the Prussians, in a great measure, owe those brilliant and astounding victories which have had the effect of raising Prussia to the position of one of the first Military powers in Europe.

Experience ever tells us how necessary it is that in our private or official life we should regulate and, as far as possible, systematize our actions ; for we find that we can perform a much greater amount of work when it has been well and carefully arranged beforehand, than if we observe but little system in the manner in which we go through it.

In perusing the histories of nations that have risen from comparatively obscure positions, we find that as they gradually rose they began to discover the necessity for a well organized system, without which they could never hope to retain that position gained for them by their perseverance.

HORSE-RACING.

Horse-racing, the practice of matching horses ridden by men against each other, is a national sport too well-known to need any elaborate explanation. Suffice it to say that a certain route or course having been marked out, the jockeys use all their skill and knowledge in riding each to bring his horse in first. The first horse, of course, wins the race. According as the race is ridden with or without fences or jumps, the run is called a "steeple-chase" or a "flat race." From a very early period horse-racing has been a favourite sport amongst most nations, but especially with the English,

whose passion for it has been cultivated to the highest extent; and who are therefore, such adepts, not only at racing, but also in the art of breeding superior horses, as to be able to compete successfully with all the racing nations.

Why England, with all her boasted civilisation and refinement has remained so long the slave of this mania, must be a marvel to every thinking man. Almost the only argument that can be brought forward in its favour is, that it tends to keep up and improve the breed of horses. This is evidently absurd: for the breed of cattle, sheep, and pigs have been equally improved during the same period of time, and yet it was not found necessary to get up cow, sheep, and pig races; and if the farmers have been induced to improve these, surely the same inducement would also make them pay strict attention to horses. Having set aside this so-called favourable argument, let us look for a moment at some of the pernicious effects of horse-racing. *Any one* who has ever been at a race, must unhesitatingly admit that human nature is here seen in all its most revolting attitudes—men, women, and children seem under fiendish influence: and swearing, drinking, fighting, gambling, thieving, and not unfrequently murder, are the unhappy results—all restraint seems to have vanished, and conscience to have become inaudible. The men and horses, too, engaged in the racing, are subjected to dangers and distresses which frequently terminate in death; and those who speculate upon the results of the race, frequently lose more than they can afford; and are consequently driven to deeds of sin and shame: the very idea of which, otherwise, would never have entered their brains. A melancholy instance of the pernicious effects of horse-racing has been presented to the public eye not long since,

in the well-known case of the Duke of Newcastle, who, possessed of colossal fortune, was, by his cursed propensity for gambling upon horse-races, reduced to penury. Many additional instances could be mentioned of the utter destruction not only of individuals, but of whole families, from the reckless folly of indulging in gambling, or of staking one's fortune on the result of a horse-race.

We thus see that, both for time and eternity, horse-racing is most deleterious to the human race; and we most earnestly pray that ere long the veil will be removed that has so long covered the eyes of most civilized nations; that some other national pastime may be introduced, which, while it permits the populace to indulge in harmless amusement, will not subject them to temptations calculated to bring many to a melancholy and deplorable end.

N.

ARITHMETIC.

A.—TIME $2\frac{1}{2}$ HOURS.

1. $2\frac{1}{8} + 3\frac{3}{10} + \frac{7}{32} + 2\frac{1}{8}$.
2. $12\frac{3}{4} - 7\frac{5}{8}$.
3. $5\frac{1}{6} \times 2\frac{5}{8} \times \frac{4}{7} \times 3\frac{3}{4}$.
4. $7\frac{4}{7} \div 7\frac{4}{7}$.
5. $53\cdot6282 + 73\cdot50036 + 9\cdot9625 + \cdot007$.
6. $30\cdot0721 - 4\cdot147283$.
7. $\cdot02634 \times 30\cdot24$.
8. $9\cdot065 \div 1\cdot225$.
9. Express 1s. 3d. as a decimal of £3 15s.
10. $5\frac{1}{2} + 2\frac{1}{3} + 7\frac{1}{2} + \frac{1}{2}$.
11. $30\frac{3}{5} - 2\frac{1}{6}$.
12. $\frac{2}{7} \times 3\frac{6}{11} \times 1\frac{5}{9} \times 2\frac{4}{15} \times 1\frac{5}{7}$.
13. $7\frac{1}{10} \div 4\frac{1}{10}$.
14. $\cdot172$ of 3s. 9d. + $\cdot072$ of a guinea, giving answer in pence.

15. $\cdot 2875$ of a lb. (avoir.) — $\cdot 2875$ of an oz.
16. $\cdot 2685 \times \cdot 48$.
17. $46\cdot 732 \div \cdot 07$.
18. Reduce $8\cdot 04$ dwts. to the decimal of a lb. troy.
19. Reduce 4 miles 3 furlongs 15 poles 2 feet to feet.
20. A creditor receives £173 15s. 6d. from the estate of a bankrupt paying 15s. 9d. in the £, what was the original debt?
21. Find (by Practice) the dividend on £8,376 5s. at 13s. 7d. in the £.
22. Find the simple interest on £1,760 for 4 years, at $6\frac{1}{2}$ per cent. per annum.
23. In 14,365,925 pints of wine, how many hogsheads, gallons, etc.?
24. If a 4 lb. loaf costs 6d. when wheat is 52s. a quarter, what ought a 9d. loaf weigh when wheat is 65s. a quarter?
25. Find (by Practice) cost of 3 qrs. 3 bus. 1 pk. at 4s. 4d. a bushel.
26. Find amount of £2,380 in 3 years, at 5 per cent. per annum compound interest, neglecting fractions of a penny.
27. Find cost of painting a room at 10d. a square yard, the length being 18 feet $10\frac{1}{2}$ inches, the breadth 17 feet $1\frac{3}{4}$ inches, and the height 12 feet 3 inches.
28. A Table as at p. 29, and to find the proportion per cent. which the whole number of third class passengers bears to the number of first and second class passengers in France and Prussia together.
29. If the 3 per cent. consols be at $93\frac{1}{2}$, what sum of money must be expended in the purchase of stock in order to obtain an income of £552 a year?
If the purchaser afterwards sell out at 95, and invest the proceeds in mortgages at 4 per cent. per annum, what will be the increase in his income?
30. What must be the dimensions of a rectangular cistern, of which the base is a square, and the depth

equal to a quarter of a side of the base, in order that it may contain 1932 gallons of water, each gallon = 278 cubic inches?

31. An event occurred 40,000 days preceding January 1st, 1871, find the year and the month, the day of the month, and the day of week on which it happened.

ANSWERS.

- A. (1) $7\frac{1}{2}$. (2) $4\frac{1}{2}$. (3) $24\frac{1}{2}$. (4) $1\frac{1}{2}$. (5) 137·09806. (6) 25·924817. (7) ·7965216. (8) 7·4. (9) ·016. (10) $15\frac{1}{2}$. (11) $6\frac{1}{2}$. (12) $2\frac{1}{2}$. (13) $1\frac{1}{2}$. (14) 25·884d. (15) 1oz. 11·6drs. (16) ·12888. (17) 667·6. (18) ·0335. (19) 23349 $\frac{1}{2}$. (20) £220 13s. 4d. (21) £5688 17s. 4 $\frac{1}{2}$ d. (22) £369 12s. (23) 28503 hhds. 51 gals. 2 qts. 1 pint. (24) ~~14~~ 1ba. (25) £5 18s. (26) £2755 2s. 11·4d. (27) £4 1s. 8d. (28) 25·21158. (29) £17135; £197 16s. (30) 278 in. and 69 $\frac{1}{2}$ in. (31) 26th June, 1761.

ARITHMETIC—EXERCISE.

B.—TIME $2\frac{1}{2}$ HOURS.

1. $3\frac{3}{4} + \frac{7}{8} + \frac{1}{2} + 1\frac{3}{8}$.
2. $12\frac{1}{10} - 9\frac{1}{2}$.
3. $2\frac{1}{3} \times \frac{1}{2} \times \frac{5}{12} \times 4\frac{1}{2}$.
4. $6\frac{1}{2} \div 7\frac{3}{4}$.
5. $73\cdot50036 + 9\cdot9625 + \cdot007 + \cdot03072$.
6. $50\cdot17328 - 31\cdot928734$.
7. $30\cdot24 \times \cdot0334$.
8. $293\cdot46 \div \cdot438$.
9. Express half-a-crown as the decimal of a guinea.
10. $\frac{1}{10} + 3\frac{1}{8} + 1\frac{1}{2} + \frac{9}{8}$.
11. $20\frac{1}{10} - 16\frac{3}{10}$.
12. $13 \times 2\frac{1}{11} \times \frac{1}{2} \times \frac{2}{3} \times \frac{5}{12}$.
13. $6\frac{7}{10} \div 6\frac{7}{10}$.
14. Express 1·28 of a crown + 5·37 of a florin in pence and decimal of a penny.
15. From ·03 of a day take ·125 of an hour.
16. $\cdot3728 \times \cdot283$.
17. $\cdot56277 \div 507$.

18. Reduce $\frac{1}{8}$ of a lb. (avoir.) to the decimal of a cwt.
19. Reduce 13 acres 12 perches to square yards, feet, and inches.
20. How many yards of carpet, $\frac{1}{2}$ yard wide, will cover a room 15 feet wide, and 18 long?
21. Find (by Practice) dividend on £9,306 15s., at 16s. 10d. in the £.
22. Find simple interest on £3,825 for 15 years, at $6\frac{1}{2}$ per cent. per annum.
23. Reduce 14,365,925 seconds to weeks, days, etc.
24. If a 4d. loaf weighs 14 oz. when wheat is 63s. a quarter, find the weight of a 6d. loaf when wheat is 84s. a quarter.
25. Find (by Practice) cost of 48 cwt. 3 qrs. $3\frac{1}{2}$ lbs. of sugar, at 24s. per cwt.
26. At what rate per cent. will £3,745 amount to £3,932 5s. in two years (Simple Interest)?
27. (a) $\sqrt[3]{512,768,384,064}$; (b) $\sqrt[3]{42\frac{1}{8}}$.
28. Find L.C.M. of 1,547, 1,728, and 4,199; and add $\frac{7}{2431}$, $\frac{8}{2717}$, and $\frac{10}{4199}$.
29. How much £100 stock at $92\frac{3}{4}$ must be sold out to pay a bill of £954 9s. 4d. due 9 months hence, at 4 per cent. per annum?
30. Bring to the decimal of 30 guineas, the sum of $\frac{1}{2}$ of $\frac{1}{2}$ of £2 5s.; $\frac{2}{3}$ of 5 guineas; $4\frac{3}{4}$ of £1 18s. 6d., and $4\frac{3}{4}$ of £2 15s.

ANSWERS.

- B. (1) $5\frac{1}{8}$. (2) $2\frac{1}{2}$. (3) $\frac{1}{4}$. (4) $\frac{1}{2}$. (5) 83.50058. (6) 18.244546.
 (7) 1.010016. (8) 670. (9) 119.476. (10) $4\frac{2}{3}$. (11) $3\frac{1}{3}$. (12) $1\frac{1}{2}$.
 (13) $\frac{1}{2}$. (14) 202.68d. (15) 35 mins. 42 secs. (16) 1055024.
 (17) .00111. (18) .0078125. (19) 63,283 square yards. (20) 40 yards.
 (21) £7,833 3s. 7½d. (22) £3,729 7s. 6d. (23) 23 wks., 5 days, 6 hrs.
 (24) 15½ oz. (25) £58 10s. 9d. (26) 2½. (27) 8004; $3\frac{1}{2}$. (28)
 L. C. M. 29393; $\frac{1}{3}\frac{1}{2}$. (29) £1,000. (30) 720238.





